

Aniekan Udoh Ekere · Bob Evans Yellowe ·
Steve Umune

Surgical mortality in the emergency room

Received: 12 January 2004 / Accepted: 7 February 2004 / Published online: 8 May 2004
© Springer-Verlag 2004

Abstract We reviewed retrospectively 125 surgical deaths in the accident and emergency department of University of Port Harcourt Teaching Hospital, a major health facility in the Niger Delta region of Nigeria, between April 2000 and March 2003. Data were extracted from the casualty records. The male-to-female ratio was 2.8:1. The mean age was 36.5±16.9, with 84 being between 20 and 49 years. Road traffic deaths constituted the highest toll ($n=52$). Head injury was the commonest primary cause of death ($n=37$), while cardio respiratory arrest ($n=59$) was the commonest secondary cause of death. The majority of patients died within 24 h. Surgical deaths constitute a significant load in emergency room deaths. Most of these are from road trauma, and efforts at prevention are advocated.

Résumé Entre avril 2000 et mars 2003 nous avons étudié rétrospectivement 125 morts chirurgicales dans le Département des urgences de l'hôpital Universitaire de Port Harcourt, centre de santé important du delta du Niger au Nigéria. Les données ont été extraites des registres des accidents. Le rapport hommes/femmes était 2.8:1. L'âge moyen était 36.5±16.9 ans avec 84 cas entre 20 et 49 ans. Les morts de la circulation routière ont constitué le plus fort groupe ($n=52$). Le traumatisme crânien était la cause primaire la plus fréquente de la mort ($n=37$) tandis que l'arrêt cardio-respiratoire ($n=59$) était la plus fréquente cause secondaire. La majorité des patients sont mort dans les 24 h. Les morts chirurgicales constituent une charge considérable dans les Urgences. La plupart sont liées aux traumatismes de la route, et des efforts de prévention sont préconisés.

A. U. Ekere · B. E. Yellowe · S. Umune
Division of Orthopaedics, Department of Surgery, University of
Port Harcourt Teaching Hospital,
Port Harcourt, Nigeria

A. U. Ekere (✉)
2 Winners' Way, Off Afam Street, D/Line,
PO Box 12640, Port Harcourt, Nigeria
e-mail: aniekere@yahoo.com

Introduction

The quality of care in the emergency room is a direct indicator of the standard of health care delivery in any given health institution [13]. Statistics extracted from the emergency room are valuable tools in health planning [18]. In our environment, relatively junior doctors man the emergency room [13], making first-hand management of patients sometimes faulty due to errors of technique of diagnosis, and delay in proper diagnosis [11]. This fact is worsened by system errors [11, 12] resulting from the downturn of the economy and the accompanying poor funding of health institutions. The surgical mortality is from trauma [5, 7], especially road traffic accidents [7, 8, 15]. The young, economically active male is shown to be the commonest victim [8, 15, 16]. The majority of the deaths occur within the first 6 h of admission [19]. Due to the inexperience of doctors who certify the patients' death, errors in causes of death are myriad, worsened by lack of training in death certification at undergraduate and graduate levels [10, 13]. Cultural beliefs in our environment do not encourage autopsy examinations, thus compounding definitive knowledge on causes of death [1].

The aim of this retrospective review was to highlight the causes of surgical mortality, age, and gender distribution of the victims, duration before demise, and pattern of death certification in the accident and emergency department of the University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria.

Patients and methods

A three-year retrospective analysis of casualty records spanning April 2000 to March 2003 was undertaken. All surgery, including orthopaedics/trauma, obstetrics and gynaecology, urology, burns, neurosurgery, patients, etc., were included. Casualty records, which included attendance register, nurses' report books, death certificates, etc., were used. Gender, age, primary illness, primary and secondary causes of death, and time in hospital before demise were data extracted for all emergency-room deaths. The surgery subset was extracted and analysed for this particular review. Multi-way frequency tables were used for analysis.

Results

The accident and emergency unit of University of Port Harcourt Teaching Hospital saw 22,791 patients between April 2000 and March 2003; 2% ($n=446$) died—125 of those 446 being classified as surgical deaths. Surgical deaths therefore constituted 28% of the total deaths. The male-to-female ratio was 2.8:1, with 66.4% ($n=84$) being within the age bracket of 20–49 years (Table 1).

Most deaths resulted from road traffic accidents (41.6%), followed by malignancies (11.2%) and assaults (8.0%). A patient with nasopharyngeal tumour died from radiation myelitis (Table 1). The primary cause of death was head injury ($n=37$), then cardiorespiratory compromise ($n=24$) and malignancy ($n=10$). Secondary causes were predominantly cardiorespiratory compromise ($n=59$) followed by malignancies ($n=7$) and intra-cranial bleeding ($n=10$) (Table 2).

The majority (72.8%) of the cases died within 24 h. Thirteen patients (10.4%) were dead on arrival, while 9.6% ($n=12$) of the patients died between 24 and 48 h. Three patients that died between 72 and 120 h had anaemic heart failure from open tibia fracture sustained from road trauma. Another anaemic heart failure death was from a malignant lesion of the right leg, while the third died from tetanus after a septic abortion. On patient who fell from a height and sustained fracture dislocation of the hip died 7 days after admission.

Discussion

Road traffic accidents are still an important public health problem in our environment [2, 7, 13, 14, 18]. There has been a changing pattern of traumatic injuries in Port Harcourt. Elechi and Etawo in 1986 [9] found domestic accidents to constitute highest trauma load with road traffic accidents coming third. In this series, road accidents

topped the list with 41.6%. This may probably be a consequence of industrialisation in a city that has become cosmopolitan by reason of oil exploration and exploitation. The road traffic problem is a world-wide trend [2, 7, 5, 15, 16]. Assault was third place in our series, while it was second in Elechi's series [9]. Malignancies constituted 11.2% of the primary illnesses. This probably is due to changing lifestyles that are becoming more westernised. The commonest malignancies in our series were breast cancers. The predominance of males is a global pattern [2, 8]. The most common age affected in this series was the 20–49 age bracket, the most productive age group in any society [2, 7, 8]. This is probably due to love of adventure, restlessness, and inherent societal responsibilities of males.

Death certification is a problem area in medical practice [10]. Autopsy examination, which is the “final court of appeal” in fatal cases, is frowned at by the Niger Delta culture [1]. The reason is that “mutilated” bodies are regarded as an abomination. This hinders knowledge. Poor infrastructure, inadequate experience of the emergency room doctors, and lack of formal emphasis on death certification give room to faulty certifications.

Head injuries constituted the most common primary cause of death in our series, followed by cardio-respiratory compromise. This is similar to Solagberus' series [18]. Cardio respiratory failure was the most common secondary cause of death, which again confirms the global pattern of heart-related compromises being one of the main causes of death for most problems [17, 20]. Malignant condition and sepsis were also common causes of death in the certification list in our study. Cordoba et al. [4], working in an internal medicine unit in Madrid, also recorded a significant oncological load in their series. It is worthy of note that the majority of deaths from intra-cranial haemorrhage were in head-injured patients. This makes head injury a major secondary cause of death in this series.

The majority (72.8%) of our cases died within the first 24 h. The first 4 hours, known as the “golden period” of

Table 1 Presenting illness, age, and gender distribution of the victims

Primary illness	Age 0–9		10–19		20–29		30–39		40–49		50–59		60–69		70+		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Road traffic accidents	–	–	62	2	131	1	11	1	10	1	3	–	22	2	–	–	45	7
Malignancy	–	–	1	1	–	–	3	3	11	1	2	3	12	2	–	–	4	10
Assault	–	–	–	–	7	–	1	–	–	–	1	–	–	–	1	–	10	–
Septic abortion	–	–	1	1	6	6	–	–	–	–	–	–	–	–	–	–	–	7
Fall	–	–	1	1	1	–	2	–	2	–	–	–	–	–	–	–	5	1
Trauma (unspecified)	–	–	1	–	2	–	–	–	1	–	–	–	1	–	–	–	5	–
Ectopic pregnancy/eclampsia	–	–	–	–	1	1	2	2	1	1	–	–	–	–	–	–	–	4
Drowning (boat accident)	1	–	1	–	1	–	–	–	–	1	1	–	–	–	–	–	3	1
PUD upper GI bleeding	–	–	1	1	1	–	–	–	1	–	–	–	–	1	–	–	3	1
Septicaemia	–	–	–	–	–	–	1	–	1	–	–	–	–	–	1	–	2	1
Intestinal obstruction	–	–	–	–	1	–	–	–	–	–	–	–	–	–	2	–	3	–
Burns	–	–	1	–	–	–	2	–	–	–	–	–	–	–	–	–	3	–
Electrocution	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	2	–
Others	–	–	1	–	1	–	–	–	3	1	–	–	–	–	2	–	7	1
Total	1	–	70	6	153	8	23	6	30	4	7	4	36	5	6	–	92	33

Table 2 Death certification distribution

Cause	Primary	Per cent	Secondary	Per cent
Cardiorespiratory arrest/failure (including anaemic heart failure)	24	19.2	59	47.2
Head injury	37	29.6	7	5.6
Malignancy	10	8.0	7	5.6
Septicaemia	8	6.4	7	5.6
Poly-trauma (multiple fractures)	8	6.4	4	3.2
Intra-cranial bleeding	1	0.8	10	8.0
Gunshot injuries (assault)	4	3.2	2	1.6
Tetanus (post-traumatic)	4	3.2	1	0.8
Spinal injury	2	1.6	2	1.6
Strangulated hernia	4	3.2	2	1.6
Drowning	2	1.6	—	—
Septic abortion	2	1.6	—	—
Intra-peritoneal injury	2	1.6	—	—
Electrolyte imbalance	—	—	2	1.6
Burns	2	1.6	2	1.6
Ruptured ectopic pregnancy	2	1.6	1	0.8
Upper GI bleeding	2	1.6	2	1.6
Trauma (non-specific)	—	—	2	1.6
Haemoperitonem/haemothorax	2	1.6	1	0.8
Severe anaemia	1	0.8	1	0.8
Radiation myelitis	1	0.8	1	0.8
Chest injuries	2	1.6	—	—
Others	5	4.0	12	9.6
Total	125	100	125	100

care, is said to be critical in the outcome of trauma cases that arrive alive in the emergency room [19]. A study in the United Kingdom recorded an elevated probability of death amongst elderly pedestrians, casualties of multiple accidents, and those in vehicles travelling at high speed, although outcome was not related to the time it took the victims to arrive the hospital [3, 7]. Presenting pathology and severity of the ailment are known factors in outcome prediction [8, 15, 14]. In our environment, considerable delay occurs due to inadequate ambulance services. Initial consultations with alternative practitioners and the unique topography of the Niger Delta region, where some islands can only be reached in over 3 hours with speed boats [6], also contribute to delays. All these factors, coupled with system and management defects due to under-development, compounds an already complex problem [11, 12].

Road accidents are a major cause of surgical mortality in our environment. Efforts should be directed mostly at prevention because of high treatment costs, which are mostly unavailable and unaffordable [7]. There is an urgent need to develop neurosurgical and cardiological infrastructures, especially at the tertiary centres, to cope with the attendant speciality-related deaths emphasised in this study. Political decisions should be directed at allocating appropriate health resources for better patient care.

References

1. Akhiwu WO, Nwosu SO, Aligbe JU (2002) Accidental deaths in Benin City Nigeria. *Nig J Orthop Trauma* 1:98–101
2. Asogwa SE (1978) Road traffic accidents: a major public health problem in Nigeria. *Public Health London* 92:27–30
3. Bentham G (1986) Proximity to hospital and mortality from motor vehicle accidents. *Soc Sci Med* 23:1021–1026
4. Cordoba VA, Delgado IL, Cabrera VR, Kessler PC, Castro C, Ranada M (1991) A mortality study in the Internal Medicine Emergency services of October 12 Hospital during 1989. *An Med Interna* 8:487–490
5. de Demeter, Horne G (1987) An assessment of trauma in Wellington region. *Aust NZ J Surg* 57:369–374
6. Eghwudjakpor PO, Green IA (2002) Improving outcome of Head Trauma: an experience in University of Port Harcourt Teaching Hospital, Nigeria. *Nig J Orthop Trauma* 1:34–38
7. Eke N (2001) Road traffic accidents in the developing world: who is liable. *Anil Aggrawal's Internet J Forens Med Toxicol* 2:1
8. Ekere AU, Etuk US (2002) Pattern of motor vehicular trauma in Port Harcourt: A prospective analysis of 180 victims. *Trop J Med Res* 6:15–19
9. Elechi EN, Etawo SU (1990) Pilot study of injured patients seen in the University of Port Harcourt Teaching Hospital, Nigeria. *Injury* 21:234–238
10. Magrane BP, Gilliland MG, King DE (1997) Certification of death by the family physician. *Am Fam Physician* 56:1433–1438
11. McDermott FT, Cordner SM, Tsemayne AB (1996) Evaluation of the medical management and preventability of deaths in 137 road traffic fatalities in Victoria, Australia: An overview from the consultative committee on road fatalities in Victoria, Australia. *J Trauma* 40:520–533

12. McDermott FT, Cordner SM, Tsemayne AB (1997) Management deficiencies and death preventability in 120 Victoria road fatalities (1993–1994). The consultative committee on road traffic fatalities in Victoria. *Aust NZ J Surg* 67:611–618
13. Osuigwe AN, Ofiaeli RO (2003) Mortality in the accident and emergency unit of Nnamdi Azikiwe University Hospital, Nnewi: Patterns and factors involved. *Nig J Clin Pract* 5:61–63
14. Seleye-Fubara D, Ekere AU (2002) Pedestrian motorcycle related deaths in Port Harcourt, Nigeria: A hospital based study. *Nig Health J* 1:123–125
15. Seleye-Fubara D, Ekere AU (2003) Pedestrian deaths resulting from road traffic accidents seen at the University of Port Harcourt Teaching Hospital—a six-year review. *Nig J Med* 12:103–105
16. Seleye-Fubara D, Ekere AU (2003) Vehicular road deaths in the Niger Delta region of Nigeria: a referral centre's experience. *Orient J Med* 15:41–44
17. Shalley MJ, Cross AB (1984) Which patients are likely to die in an accident and emergency unit. *Br Med J (Clin Res Ed)* 289:419–421
18. Solagberu BA, Duze AT, Ofoegbu CP, Adekanye AO, Odelowo EO (2000) Surgical morbidity and mortality pattern in the accident and emergency room—a preliminary report. *Afr J Med Sci* 29:315–318
19. Solomon L, Warwick DJ, Nayagam S (2001) Apley's system of orthopaedics and fractures, 8th edn. Oxford University Press, New York, pp 521–538
20. Zheng ZJ, Crodt JB, Giles WH, Mensah GA (2001) Sudden cardiac arrest in the United States 1989–1998. *Circulation* 104:2158–2163